## CLAIMS

What is claimed is:

1. A scanning micromechanical monochromator with integrated slit apertures for spectroscopic analysis, said micromirror spectrometer system comprising:

(i) a radiation source;

(ii) a controllable diffraction grating, to reflect or transmit light;

(iii) a scanning mirror based on MEMS technology;

(iv) a micromirror driving unit for oscillating the scanning mirror in different wavelength regions;

(v) a parabolic or spherical mirror or achromatic lens positioned to focus the light beam;

(vi) entrance and exit spatial filters consisting of fixed collimator optics and slit apertures, defined as at least one of the slit apertures is part of the monolithic body of the device;

(vii) a detector for detecting radiation reflected or transmitted from the sample;

(viii) a micromirror spectrometer with torsion mirror and an integrated grating receiving spectroscopic signals from said sample and operated in different wavelength regions; and

(vi) a sample positioned in the path of the analyzing light beam.

2. An ultra-compact micromirror spectrometer according to claim 1 comprising of at least one of the slit apertures in the torsion element is located within the diffraction grating preferably on its rotational axis. A combined mirror torsion diffraction grating based on MEMS technology where the grating disperses the polychromatic light and the torsion mirror scans the wavelength.

3. A micromirror spectrometer according to claim 2, consisting of the collimator optics of at least one spherical mirror and a combined mirror torsion diffraction grating.

4. A micromirror spectrometer according to claim 3, defined as, that the surface of the torsion element on those wavelengths specific arrival points of the focused monochromatic partial radiation outside of the exit slit aperture is locally designed as a mirror; and/or a screen within the radiation path of the reflected partial radiation or the zero diffraction order is mounted.

5. A micromirror spectrometer according to claim 4, consisting of one secondary entrance slit aperture and several secondary exit slit apertures within the monolithic body of the torsion diffraction aperture for simultaneous selection of the monochromatic partial radiation of different wavelength intervals.

6. A micromirror spectrometer according to claim 5, comprising a monolithic body of the torsion diffraction grating and further slit apertures designed for the purpose, that groups of these slit apertures by mutual use of the collimator optics and the diffraction grating, form several from each other independent monochromator channels with crossing beam paths, while one of the additional monochromator channels is used for phase control of the angle movement of the torsion grating as an option.

7. A micromirror spectrometer according to claim 6, wherein, the torsion diffraction grating is replaced by a controllable micromechanical torsion mirror with external, fixed diffraction grating, while at least one of the slit gratings is part of the monolithic body of the micro mechanical torsion mirror or is optionally integrated as a fixed element in the body.

8. A micromirror spectrometer according to claim 7, where instead of at least one of the monolithic integrated slit grating a sufficient large slit within the monolithic body of the micro mechanical torsion grating respectively torsion mirror is arranged, while related optical wave guides and/or radiation detectors have a sufficiently small aperture area, being part of the space filter.

9. A handheld micromirror spectrometer apparatus according to claim 1 comprising of a radiation source, a micromirror spectrometer with integrated slit aperture, detectors, accessories and analyzing unit, for analysis of human skin in vivo using a near infrared (NIR) or middle infrared (MIR) radiation source and infrared sensitive diffraction grating, optics and detectors.

10. A handheld micromirror spectrometer device according to claim 9, for online remote detection of bioaerosols, biological agents and toxic gases using a tunable infrared light source including a laser.